

REMARKS

This responds to the Office Action mailed on January 10, 2008.

Claims 11 and 12 are canceled; as a result, claims 1, 3, 4, 8-10, 23-26 and 30-37 are now pending in this application.

§102 Rejection of the Claims

Claims 11 and 12 were rejected under 35 USC § 102(e) as being anticipated by Wachtler et al. (U.S. 6,274,391 B1). Claims 11 and 12 were canceled to facilitate prosecution of the remaining examined and Withdrawn claims.

§103 Rejection of the Claims

Claims 1, 3, 4, 34 and 35 were rejected under 35 USC § 103(a) as being unpatentable over Wachtler et al. in view of Watson et al. (U.S. 5,168,926). Applicant respectfully traverses the rejection and requests the Office to consider the following.

The Applicant thanks the Office for finally admitting that “Wachtler fails to show a thermally conductive material adhering said at least one microelectronic die back surface to said recess bottom” (Office Action at page 5):

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However, Wachtler et al. fails to show a thermally conductive material adhering said at least one microelectronic die back surface to said recess bottom surface.

This admission has come at considerable expense incurred by the Applicant.

The Office cites to Watson to fill what is admitted to be missing in Wachtler. But claim 1 has the limitations of

a heat spreader having a first surface, said heat spreader having at least one recess defined therein by at least one sidewall extending from said heat spreader first surface to a recess bottom surface ...

at least one microelectronic die disposed within said at least one recess...

a thermally conductive material adhering said at least one microelectronic die back surface to said recess bottom surface...

build-up layers disposed on said microelectronic die active surface and said heat spreader first surface.

Watson's chip carrier 28 is definitely not disposed in the recess 24. Watson's chip carrier 28 is disposed on the support surface 22 which is an upper surface. The combination of Wachtler and Watson result in a chip that must be adhered to both the upper surface and the recess bottom surface; an impossibility. Further, Watson has no structure that could accommodate the build-up layers disposed on both the die active surface and the heat spreader first surface. Watson teaches exactly the opposite of Wachtler, as to where his chip carrier should be located; on Watson's upper surface as opposed to immersed inside Wachtler's recess. Thus the combined teaching teaches away from what is claimed. Further, the Office has admitted "Wachtler fails to show a thermally conductive material adhering said at least one microelectronic die back surface to said recess bottom" (Office Action at page 5). As stated in previous responses, Wachtler teaches away from this limitation.

Wachtler gives at least five teachings that teach away from positioning his adhesive where Applicant claims adhesive, and from position his die where Watson positions his carrier chip. Consequently, Wachtler teaches away from Watson.

First, Wachtler teaches that the "primary thermal path for the semiconductor device 16 is to the air which is very short because the semiconductor device is attached directly to the substrate or packaging 12". (Wachtler at column 8, lines 18 et seq). "Attached directly" implies nothing is therebetween. Watson teaches something therebetween. These teachings are incompatible to combine the references.

Second, Wachtler, who is vitally interested to "optimize heat dissipation" (Wachtler at column 2, line 26), teaches that "[i]f adhesive material is used, the die attach material may ... be ... thermally non-conductive." (Wachtler at column 8, lines 56-57). Thus, adhesive material may not be used, but if it is, it may be thermally non-conductive. This teaching militates further away from inserting the adhesive between the die 16 and the substrate 12, but not in the gaps as he teaches. These teachings are incompatible to combine the references.

Third, Wachtler states and illustrates, and Wachtler only teaches that the “adhesive material may or may not fill the gap between the edge of the semiconductor device 16 and the cavity 14”. (Wachtler et al. at col. 8, lines 60-61). This, accompanied with his teaching of “if adhesive material is used” (*supra*), further militates against teaching what is claimed. A previous Office Actions states that “the figures of Wachtler et al. are not drawn to scale.” (Final Office Action at page 3). But the only reference Wachtler makes for “not to scale” is with respect to FIG. 18, not the junction of items 12 and 16. Because Wachtler only teaches no space for an adhesive on the backside surface and Watson teaches the opposite, these teachings are incompatible to combine the references.

Fourth, Wachtler illustrates no space for an adhesive between structure 18 and structure 16 at the backside surface thereof. Because Wachtler teaches no space for an adhesive on the backside surface and Watson teaches the opposite, these teachings are incompatible to combine the references.

Fifth, Wachtler teaches that the “surface of semiconductive device 16 opposite cavity 14 should contain the bond pads of the die and be flush with the surface of the substrate 12” (Wachtler at column 8, lines 64 et seq). This indicates an adhesive therebetween would make a “flush” match of surfaces difficult. And Watson teaches his carrier chip 28 is disposed on the upper surface of his heat sink 10. These are incompatible teachings to combine the references.

These several teachings further militate against combining Wachtler with Watson. Withdrawal of the rejections is respectfully requested.

Claims 36 and 37 were also rejected under 35 USC § 103(a) as being unpatentable over Wachtler et al. in view of Watson et al. and further in view of Shibamoto et al. (U.S. 6,563,212 B2).

The Office has admitted Wachtler does not teach the positioning of the adhesive where claimed. The Applicant has demonstrated the impropriety of combining Wachtler and Watson. Shibamoto does nothing to remedy these deficiencies. The Office Action states the cited references are analogous art. But Wachtler and Watson are incompatible references as stated above. Withdrawal of the rejections is respectfully requested.

RESERVATION OF RIGHTS

In the interest of clarity and brevity, Applicant may not have addressed every assertion made in the Office Action. Applicant's silence regarding any such assertion does not constitute any admission or acquiescence. Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner's personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, Applicant timely objects to such reliance on Official Notice, and reserves all rights to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

CONCLUSION


Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney ((801) 278-9171) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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